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Self-regulation and Tobacco Use: Contributes of the Confirmatory Factor Analysis of the Portuguese Version of the Short Self-Regulation Questionnaire

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Abstract

Self-regulation has been one of most studied developmental skills, given its close relation with health and lifestyle, adjustment and resilience and in the prevention of risk behaviours as substance use. Given the lack of studies about self-regulation and tobacco use in Portuguese context, this paper aims to present the results of the confirmatory factor analysis of the Short Self-Regulation Questionnaire (Carey, Neal & Collins, 2004) in our population, exploring the role of self-regulation in tobacco use. To do that, the SSRQ and a socio-demographic questionnaire was administered to a sample of 390 adolescents, mostly females (n=228, 59.2%), with ages ranging from 15 and 18 years old (M=16.05, SD=.865). Results allow us to find a good fit model with good reliability of the SSRQ. Descriptive statistics and differential studies allow us to find differences in impulse control according gender and a negative correlation with age. Results allow us also to verify a negative correlation between self-regulation and onset age of tobacco use and a negative correlation between control impulse and tobacco use. Data is analysed according to the literature and its implications to prevention and further researches are presented.

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Keywords: Self-regulation, Adolescence, Adaptation study, Confirmatory Factor Analysis;

1. Introduction

This paper aims to present a confirmatory factor analysis of the Short Self-Regulation Questionnaire (SSRQ), a measure used to evaluate a process that has been extensively studied in scientific literature related to resilience and well-being (Elliot, Thrash & Murayama, 2011; Gardner, Dishion, & Connell, 2008). This enthusiasm has raised a number of measures and theories whether applied to specific behaviours or processes whether acknowledging self-

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regulation as a skill or ability applied to difference circumstances or behaviours. In our context, self-regulation has been extensively studied in a processes perspective related to learning and school achievement. In health context, there is a gap in terms of measures that compromises further applications. Doing so, this paper presents the results of the confirmatory facto analysis of a measure that has been used to study self-regulation and substance use, applying it to tobacco use.

2. Self-regulation and tobacco use

In recent years, self-regulation theory has been used to understand and explain the behavior of the subjects, due largely to methodological limitations of traditional approaches to the explanation of risk and health behaviors over time (Timms, Rivera, Collins & Piper, 2014). Indeed, self-regulation and self-regulation failure, has been described as a process that allow us to fill the gap between intentions and behavior (de Ridder & de Wit, 2006), thus placing itself at the heart of health promotion research and practice.

In literature review, most of the models were designed in adult population, being then translated to youth, causing some inconsistency or doubts. However, some agreement has been rising in the conceptualization of self-regulation, as a personal ability or skills relatively stable and persistent (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Gestsdottir, Bowers, Eye, Napolitano, & Lerner, 2010; Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004), that allow us to activate, monitor and inhibit behaviour, attention, emotions or cognitive processes when facing internal or external challenges to achieve desired outcomes (Demetriou, 2000; Moilanen, 2007). Learned according educational practices since early years (Karreman, van Tijl, van Aken & Dekovic, 2006; Piotrowski, Lapierre & Linebarger, 2013), these have been related positive outcomes.

Applied to substance use, some studies have found a relationship between self-regulatory skills and substance use. For example, some studies highlight the relationship between lower self-regulation and recurrent drinking (Wills & Dishion, 2004; Wills, Walker, Mendoza & Ainette, 2006), whether at random use as in the intensive use (Carey, Neal & Collins, 2004; Garcia del Castillo & Dias, 2007; Neal & Carey, 2005). In self-regulation and tobacco use, less research is known, despite some evidence showing its important role in understanding the experience and intensity of tobacco use (Djordjevic, Fan, Ferguson & Hoffmann, 1995; Garcia del Castillo, Dias, Diaz-Perez & Castillo-Lopez, 2012), adaptation and smoking cessation (Browning, Wewers, Ferketich, Otterson & Reynolds, 2009; Oettingen, Mater & Thorpe, 2010; Timms, Rivera, Collins & Piper, 2014).

Thus, this work aims to present the confirmatory studies of the Portuguese version of SSRQ, an instrument for the evaluation of self-regulation, exploring its role in the explanation of onset and intensity of tobacco use by Portuguese adolescents. The SSRQ was based on the Self-Regulation Questionnaire (SRQ), an instrument with 63 items developed by Brown, Miller and Lawendowski (1999) to evaluate seven specific self-regulation processes with good properties (in terms of validity and with reliability of $\alpha = .91$). Adopting a dispositional perspective, Carey, Neal and Collins (2004) proposed a short version with 31 items with only one factor, with good validity, reliability ($\alpha = .92$) and high correlation with the original version ($r = .96$). From this first version, Neal and Carey propose in a follow-up study, a version with two factors - Impulse control and Goal setting -, with a stable structure and internal consistency between .84 to .86 (overall $\alpha = .86$).

This measure has been adapted for some countries (eg. Potgieter, & Botha, 2009; Vahdat, Sharifi & Jafari, 2013), including Portugal. With a sample of Portuguese adolescents, and Exploratory Factor Analysis, Garcia del Castillo and Dias (2009) found a good factor structure, with most of the items with loadings in the original factors, and high reliability, given the total alpha of .89, ranging from .82 Impulse Control subscale and .85 on the subscale Goal setting. This paper we intend to present the results of the confirmatory factor analysis of the SSRQ with Portuguese adolescents, exploring the role of self-regulation in tobacco use.

3. Method

3.1. Sample

In our study participated 390 adolescents, 157 males (40.8%) and 228 females (59.2%), aged between 15 and 18 years old (M=16.05, DP=.865). At the time, most of the sample was in the 10th school year (n=326, 83.6%).

Table 1. Sample characteristics.

Variable		n	%
Gender	Female	228	59,2
	Male	157	40,8
Age	15	106	27,7
	16	180	47,0
	17	69	18,0
	18	28	7,3
School year	10th year	326	83,6
	11th year	46	11,8
	12th year	18	4,6

3.2. Instruments

To collect data, we used a socio-demographic questionnaire and the Short Self-Regulation Questionnaire. The socio-demographic questionnaire allow us to gather personal data of the sample (eg.: gender, age, school year) and tobacco use (the experience of tobacco use, onset age of age of tobacco use and tobacco use by month).

Short Self-Regulation Questionnaire (Carey, Neal & Collins, 2004), is a measure with 29 items with likert scale answer. Despite the general self-regulation score, further studies suggested (Neal & Carey, 2005) a bi-factorial structure, considering *Impulse control* (14 items, eg.: I get easily distracted from my plans) and *Goal setting* (15 items, eg.: I usually keep track of my progress toward my goals).

3.3. Procedures

After the authorization of authors to use the SSRQ in our research, data was gathered in a non-probabilistic sample of Portuguese public secondary schools, with the consent of schools and parents. Data was collected in the classroom, during normal class time, by a researcher, codified and analyzed in the Statistical Package for Social Sciences program (v.15).

4. Results

Psychometric properties

Confirmatory Factor Analysis was used to evaluate validity of the measure, comparing two models. The single factor model, testing self-regulation as a whole, did not provide an adequate fit to the data, given χ^2 fit (376) = 1193,92 $p < .001$, χ^2 fit/*df* ratio = 3.17, CFI = .70 and RMSEA = .08 (90% confidence interval = .070 - .079). The two factor model, constrained items of goal setting and impulse control dimensions on each original factor, providing best fit to the data, χ^2 fit (376) = 735.05, $p < .001$, χ^2 fit/*df* ratio = 1.96, CFI = .87 and RMSEA = .05 (90% confidence interval = .044 - .055). In terms of reliability, the Cronbach Alpha allow us to find good values, as α = .893 at the total scale and α = .849 at the Goal setting and α = .839 in Impulse control dimensions.

Table 2. Descriptive statistics of the questionnaire.

	Min.	Max.	M	SD	Percentile 25	Percentile 50	Percentile 75	Alpha
Goal setting	22,00	72,00	56,784	7,4802	52,000	57,000	62,000	.849
Impulse control	25,00	70,00	49,960	8,474	44,000	51,000	55,000	.839
Total score	71,00	140,00	106,864	13,982	96,000	107,000	117,000	.893

SSRQ and Demographic Factors

Differential studies allow us to verify gender differences in impulse control, with girls presenting higher average (M = 50.959, SD = 8.445) than boys (M = 48.336, SD = 8.400) with significative differences [t (317) = 2.702, p = -007]. When relating with age, only in Impulse control we found a correlation, negative and very week (r = -.155, p =

.005) and total score (r = -.165, p = .006). With school year, correlations were found in Goal setting(r = -.134, p = .017), impulse control (r = -.115, p = .035) and total score (r = -.162, p = .006).

SSRQ and Tobacco Use

Despite no differences in self-regulation were found between adolescents who tried tobacco and those who didn't in their lifetime, we could verify a negative correlation with onset age of tobacco use (r = -.158, p = .048) and a negative correlation between control impulse and tobacco use (r = -.111, p = .049).

5. Discussion and Conclusion

In this paper, authors aimed to present Confirmatory Factor Analysis of SSRQ to Portuguese adolescents. Results allow us to reinforce the two factor structure - Impulse control and Goal setting -, given the higher adjustment indices of validity and reliability, in line with the retested study from Neal and Carey (2005) and the previous Portuguese study (Garcia del Castillo & Dias, 2009). Despite the dispositional approach assumes self-regulation as a transversal skill, its definition allow us to differentiate between two important components as the ability to control emotions, behaviors and cognitions to assumed or desired goals and outcomes (Demetriou, 2000; Moilanen, 2007).

This way, we can assume this two component version as more sensitive to self-regulation factors and more stable and reliable to the evaluation of this skill. These data highlight also the determinant role of impulse control, as an important component in goal directed behavior (Hofmann, Friese & Wiers, 2008), higher in girls, especially by the effect of educational practices (Karreman, van Tijl, van Aken & Dekovic, 2006; Piotrowski, Lapierre & Linebarger, 2013).

A surprising result is the negative correlation with age, considering the stable character of this variable (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004). However, recent neurobiology studies might allow us to understand these results, considering some evidence that sustain more vulnerable cognitive control process during adolescence (Casey & Jones, 2010).

Also in the application of the measure to tobacco use, we found similar data than the one related to alcohol (Garcia del Castillo & Dias, 2007; Neal & Carey, 2005; Wills & Dishion, 2004; Wills, Walker, Mendoza & Ainette, 2006), considering the differential effect in onset tobacco use and intensity of smoking. These are interesting data that reinforce the need to explore the role of this skill in the explanation but especially in the prevention of risk behaviors.

In the end, this study allows us to suggest the use of this measure to evaluate self-regulation in future research, once it is a small measure and with good psychometric properties in Portuguese population. Moreover, it allow us to deepen our knowledge in further studies to understand the dynamic of self-regulation over time in order to prevent risk and promote health behaviors.

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